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ABSTRACT

Birnbaum's 1982 study of diversity in higher education is reviewed, and the development of an indicator series on institutional diversity is evaluated. Birnbaum studied diversity in higher education in the framework of a natural selection or population ecology model, which emphasizes the importance of environmental factors in shaping populations of organizations. Organizations are viewed as evolving through three stages: variation, selection, and retention. Earlier reports have cited six dimensions of diversity: governance, output, finance, program, clientele, and delivery system. In the context of the population ecology model, the dimensions of program, clientele, and delivery system show the most promise for compatibility. Attention is directed to the following factors that have been addressed in consideration of diversity in higher education: internal and external diversity, programmatic diversity, procedural diversity, systemic or structural diversity, constituential diversity, reputational diversity, and value and climate diversity. The method and findings of Birnbaum's study are discussed, and attention is directed to how further study of diversity can build on Birnbaum's work. It is suggested that further refinement of diversity measures is not the best direction. A 12-item list of references concludes the document. (SW)

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This report represents the final stage of a plan to study diversity in higher education; specifically on the development of an indicator series on institutional diversity. Earlier reports focused on a preliminary analysis of diversity concepts--essentially an exploration of possibilities rather than an evaluation or critique. The latter approach is emphasized in the present document.

A review of literature and research in the area of diversity and an assessment of where further contributions should be made leads us to conclude that the further refinement of diversity measures is not the most important direction to take. The level of diversity and of changes in it over time have been studied extensively from several perspectives. Although, perhaps, a single definitive study has not been attempted, enough elements have been analyzed to give us a good reading of both measurement and change.

The present report will begin by reviewing a recent study completed by Birnbaum (1982). This study will be highlighted because it proposes an interesting conceptual or theoretical approach which may prove a useful tool in the study and understanding of diversity in higher education. Subsequently, we will seek to indicate ways in which further study of diversity can build on Birnbaum's work.

Though several studies have been done on diversity, we have lacked a framework for integrating findings, conclusions, and recommendations. This integration is considered important if we are to move beyond the perennial and increasingly platitudinous questions of how much diversity we have and whether we have more or less than yesterday. The model proposed by Birnbaum may be an important step in this integrative direction.

Diversity and the Population Ecology Model

Birnbaum has done a nice job of explicitly studying diversity in the framework of a natural selection or population ecology model. This model, based on the natural selection model of biological ecology, emphasizes the importance of environmental factors in shaping populations of organizations. Birnbaum summarizes the model as follows:

> The model proposes that the environment acts in such a way as to select certain types of organizations for survival based upon the fit between the particular characteristics of the environment and the form of the organization. As the characteristics of the environment change, it would be expected that organizational forms would change as well (pp. 1-31).

As presented by Birnbaum, the model is designed to explain change in populations of organizations rather than individual organizations. Organizations, or institutions, are said to evolve through three stages: variation, selection, and retention.

Three Stages of the Population Ecology Model. Variation in higher education is what is normally referred to as diversity. This variation, or diversity, precedes and is necessary for selection mechanisms to operate. It is manifested through the creation of new institutions or the development of innovations in existing organizations. The variations can either be planned or unplanned, or may actually be unexpected results of organizational activities. Whether planned or unplanned, however, these variations permit the operation of selection mechanisms.

Selection of new or changed organizational forms or variations is determined by environmental needs or constraints. Those variations which fit or match the needs of the environment are "positively selected" and, by definition, survive. Those variations which are not selected must either be

altered to match the environment or they will fail ("negative selection"). The focus in this selection stage, according to Birnbaum, is on the competition for resources in the environment. Aldrich (1979) notes that selection occurs through the relative rather than absolute success in securing these resources, and an effective organization is only one which has achieved a relatively better position in the environment it shares with others (p. 30).

The third stage--retention--is characterized by the preservation and reproduction of successful or "fit" organizational forms. As environments change, the "fit" of an organizational form will also change; selection criteria and retention mechanisms will react accordingly.

Diversity and Niches. A central concept in the population ecology model is that of the niche. "Each distinct combination of resources and other constraints that support an organizational form constitutes a niche, defined in ecological terms as 'any viable mode of living'" (Aldrich 1979, p. 30).

Birnbaum cites a number of major characteristics of niches which are important in considering the evolution of "species" or institutional types.

First, niches are unique combinations of resources which offer the potential of environmental support. Niches may or may not be filled. The existence of student demand for college and the availability of financial resources is an example of a niche which may be filled or go unrecognized.

Second, niches change over time as environmental factors change and as the organizations in the niche change. For instance, as resource availability varies, niches may be altered or eliminated. Birnbaum notes the importance of the interdependence of niches. In quoting Boulding (1981), he notes: "The

principle is that 'the niche of one species cannot change without changing the niches of all others in the ecosystem'" (pp. 1-37, 38).

Third, biological species or institutional types can co-exist "only if they occupy different niches." That is, if two species are competing for the same resources, one will have an advantage and the other will fail, change, or have to go elsewhere. This Principle of Competitive Advantage suggests that an organizational population can be only as diverse as the environment or niche complex which supports it (Hannan and Freeman, 1977). In higher education, then, the greater the number of niches, the greater the number of institutional types that can potentially be supported or sustained by the environment.

Birnbaum makes the important point that in a condition of abundant, i.e., excessive, resources, two or more similar species can co-exist. Thus, excessive demand and resource availability for higher education can create environments which sustain two or more institutional types competing in essentially the same niche; that is, for the same resources. As this resource abundance is reduced, one of the institutional types will be at an advantage.

Fourth, environmental changes can affect the character and resources in an institution's niche. That is, "as conditions which created a particular niche change, the niche itself may be modified or changed" (Zammuto, 1982; cited by Birnbaum, p. 1-39).

Diversity and Institutional Survival. A diverse system of higher education does not require the preservation of each of its components. In fact, "diversity is enhanced as less adapted institutions succumb and are replaced by new and more attractive variations" (Birnbaum, p. 1-46).

The Meaning and Dimensions of Institutional Diversity

Earlier reports cited six dimensions of diversity which seemed important to measure:

1. Governance
2. Output
3. Finance
4. Program
5. Clientele
6. Delivery System

In the context of the population ecology model just presented, the last three dimensions listed above--Program, Clientele, and Delivery System--show the most promise for compatibility. To be sure, the dimensions of Output and Finance are key factors to consider in any discussion of environmental factors. However, the last three are also considered by Birnbaum and will be emphasized in our own plan to study diversity.

Birnbaum presents an excellent discussion and review of those factors which are variously considered when we speak of diversity in higher education. An examination of these factors is considered an important step towards a true understanding and critical examination of the meaning of diversity in higher education. Some of the important dimensions of this phenomenon are described below.

Internal and External Diversity. An important distinction to make in studying diversity is between internal and external diversity. Internal diversity refers to the differentiations of structures, clienteles, roles, and especially program offerings within an institution. External diversity, on the

other hand, refers to distinctions on these dimensions between institutions. Most research and discussion on diversity is focused on external diversity; that is, on the extent of differences between and among institutions. Many observers note that while external diversity in higher education has decreased, internal diversity has increased. The assumption or argument is that the increase in internal diversity cancels out the loss of diversity between and among institutions.

Birnbaum makes an important contribution in arguing convincingly that internal and external diversity are not additive phenomena. Actually, they seem to be negatively correlated. He notes:

> As institutions with previously distinctive characteristics become more internally diversified, they may tend to become somewhat more alike and less different from each other. For example, if a liberal arts college adds a degree program for disadvantaged students, while an urban community college develops two-year transfer programs and a general education core, they both become not only more diversified themselves but also come to share characteristics which previously were unique to each (p. 2-3).

This is an important perspective and largely contradicts conventional assumptions or arguments.

Below we consider various dimensions on which institutional diversity--both internal and external--is usually measured.

Programmatic Diversity. Programmatic diversity can be distinguished or measured on at least five bases: degree level, degree area, comprehensiveness, mission, and emphasis.

Most of these factors are obvious. The concept of program emphasis refers to those characteristics which "distinguish an institution . . . from institutions which in most other respects are similar to it" (Birnbaum,

p. 2-8). This factor is what we usually refer to as institutional distinctiveness.

Procedural Diversity. Procedural diversity refers to how programs are offered. Generally, there is not much diversity on this variable. Therefore, this is one area in which an institution can distinguish itself. When present, this is perhaps the most important measure of diversity in higher education. It may be that distinctiveness in how an institution carries out its mission is what most people look for in trying to distinguish among colleges and universities. More will be said about distinctiveness in a later section.

Systemic or Structural Diversity. This dimension refers to differences in institutional type, size, and control. These differences are the ones most focused on in the literature on diversity. Efforts to construct typologies or classifications of institutions typically rely on these basic distinctions although most efforts will go beyond these structural variables.

Institutional type distinctions take essentially two forms. First, there is the distinction between two-year and four-year colleges. Secondly, finer distinctions among four-year colleges are made by looking at program offerings, especially the highest level of degree offered. Institutions can offer a bachelors, masters, or doctorate degree as their highest offering.

Size is usually used to further distinguish the above categories. Distinctions are made between small and large universities and the reference is invariably to size of enrollment. In some cases, the range in size can be considerable. In others, such as among liberal arts colleges, this range in size will not be as great.

The third structural variable is control, the major distinction being between the public and private sectors. The private sector can be non-profit, proprietary, independent, denominational, or state-aided in part. The control variable is usually central in studies of diversity and the Birnbaum study is no exception.

Constituential Diversity. The principal constituential component considered in most studies is the student. The characteristics of students vary among institutions and thus constitute a dimension of diversity. These distinctions are made within as well as between institutions. Six student characteristics appear to be the most important in portraying institutional diversity: race, sex, income, ability, level, and status. While distinctions are often made when looking at internal diversity, the application is usually made to external diversity. Black or predominantly black institutions are often a focal point in diversity studies.

Single-sex institutions are another focus of diversity studies (e.g., Anderson, 1976). This distinction is important today because the single-sex college is a rarity--especially men's colleges. They may be, in part by definition, among the most distinctive institutions in higher education.

Religion continues to be an important factor in diversifying higher education. Religious or denominational institutions are probably the most numerous of the distinctive institutions. Although some of these institutions enroll a diversity of students, many effectively or by design exclude students "outside the faith."

Income or socio-economic status is another characteristic which distinguishes student bodies. Although within-institution variations on this

variable are often significant, there is also a strong interaction between this student characteristic and institutional type. The most commonly recognized variation is between the public two-year and other colleges. Two-year colleges tend to enroll a disproportionate number of low-income students.

Student ability is another variable by which students and institutions are often distinguished. Academic ability, as measured by various tests or high school grades or both, is usually considered a factor most associated with the private sector. This variable, then, has often been used to make summary comparisons between the two sectors. Variations within the public sector, however, are becoming increasingly important.

The student, of course, is not the only "constituent" in institutions of higher education. In a later section we will consider how faculty characteristics can also be considered in studies of diversity. Nevertheless, students, or the "clientele", are clearly the most common variables when references are made to diversity in constituency.

Reputational Diversity. Reputational diversity is closely related--at least empirically--with student ability, and less often, with faculty credentials. Institutional selectivity is often used as a measure of, or proxy for, reputation. Although this dimension of institutional diversity is difficult to study because of data availability, it will be argued later that this distinction will become increasingly important in discussions of diversity.

Value and Climate Diversity. The values of students and faculty are factors which are considered by some to be important measures of diversity. Anderson (1976) and Pace (1974) both focused on variations in student values

across institutions and over time. In one of the few studies which notes an increase in diversity over time, Pace cites increased diversity in the values held by students in universities.

Institutional climate or environment has also been demonstrated to vary across institutions. This characteristic is most often cited in describing very distinctive institutions. Institutional climate probably does not vary in a major part of the higher education system.

This section has presented various dimensions of diversity in higher education. The list demonstrates, in effect, the presence of a considerable amount of diversity in higher education. Nevertheless, researchers are still interested in asking whether we have enough diversity in higher education. Birnbaum's study and the population ecology model he presents provide a good opportunity to explore this question.

The following section will review the method and findings of Birnbaum's study and consider how further research can contribute to the empirical and theoretical direction he suggests.

Birnbaum Study: Changes in the Population, 1960-1980

Birnbaum has studied changes in the composition of the higher education system between 1960 and 1980. The sample consists of all colleges and universities existing these two years in eight states. The states selected were: New York, Massachusetts, Virginia, Florida, Michigan, Wisconsin, Washington, and Texas. The sample is said to be roughly representative of all institutions in the country (p. 4-30).

There were 615 institutions in the eight states in 1960. Of these, 493 (80.2%) still existed in 1980. The other 122 institutions either failed, or merged with another institution thereby losing their identity. There were 885 institutions in 1980. Of these, 392 (44.3%) were new.

The focus of the study was on changes in populations of organizations, or institutional types, rather than individual institutions. Following the population ecology model, "changes in the distribution of organizational forms are viewed as a response by the system of institutions to more closely 'fit' the demands of the social environment" (p. 4-1).

Institutional "species" or types were defined on the basis of six variables: control, size, sex of student body, program, degree level, and minority enrollments. The values of the six variables are shown below:

Control: 4 values: public, independent, religious, and proprietary

Size: 3 values: small=<1000 enrollment; medium=1000 to 2500; and large=>2500

Sex: 2 values: co-educational, single-sex

Program: 4 values: liberal arts, comprehensive, professional/technical, and teacher education.

Degree level: 4 values: (highest degree offered) two-year degree, baccalaureate, masters degree, and the doctorate

Minority Enrollment: 2 levels: less than 50 percent minority enrollment, more than 50 percent minority enrollment.

The values of each of these variables were determined for each of the institutions in the 1960 and 1980 samples. The study involved analyzing changes in the distribution of institutional types across the two years. The first step in the analysis consisted of a series of univariate tables which noted the "before and after" distributions on the six variables. The findings were not surprising. Birnbaum summarizes them thus:

> "In general, institutions tended more often to be public and less often to be controlled by religious groups, to have moved toward offering higher degree levels, to have comprehensive programs, to increase in size, and to be coeducational at the end of the study period than at the beginning" (p. 5-18).

Among the interesting findings cited by Birnbaum were the following:

- the public sector gains were "not at the expense of the private sector which also grew albeit at a somewhat slower rate"
- New colleges were predominantly two-year institutions. However, the high rate of failure among them during the 20-year period meant that their proportional representation increased only slightly.
- Although the proportional representation of liberal arts colleges decreased, the absolute number of these institutions actually increased slightly.
- Fully a third of the institutions in 1980 still enrolled less than 1000 students and new institutions tended to be small.
- Single-sex institutions tended to become co-ed and teacher-training institutions were eliminated totally.

In his use of the natural selection model, Birnbaum was particularly interested in institutional failures. He found the following characteristics were associated with mortality:

- o two-year degree level
- o teacher-preparatory curriculum
- o religious control
- o small enrollment
- o single-sex enrollment

It should be emphasized that Birnbaum is looking at changes in institutional types rather than institutions per se. As such, the patterns refer to categories which are growing, declining, or dying rather than specific colleges or universities.

The preliminary univariate analysis found that independent control and liberal arts curriculum, counter-intuitively, were not related to mortality. Conversely, public control and professional/technical curriculum were. These factors were explored further in the multivariate analysis of diversity and will be discussed below.

Changes in Diversity by Type

The analysis of diversity conducted by Birnbaum is perhaps the most comprehensive attempted to date. This section considers the methodology and findings.

Using the six variables specified in the previous section, Birnbaum constructed a "diversity matrix" consisting of 768 cells or potential institutional types. Each of the institutions in each of the samples was

assigned to one of the cells on the basis of its values on each of the variables. The matrix becomes a valuable tool for examining the distribution of institutions and institutional types. Hence, "diversity is defined as a function of the concentration and dispersal of institutions within the diversity matrix; diversity increases (therefore) as concentration decreases and dispersion increases."

In 1960, the 615 institutions in the sample were distributed in 144 different cells in the matrix. Thus, 144 institutional types were identified. The biggest cell contained 53 institutions. On the other hand, there were 56 institutions which had their own cell. These are referred to as "singlets" by Birnbaum and probably could be considered the most distinctive institutions in the population or sample.

The 1980 sample of 885 institutions was distributed across 138 different cells. The number of different types then was somewhat reduced. Furthermore, 123 institutions now occupied the most populated cell, and the number of singlets was reduced to 48. Interestingly, while the biggest cell accounted for 8.6 percent of the total sample in 1960, it accounted for 13.9 percent in 1980. Birnbaum thus found "prima facia" evidence of a decrease in diversity between 1960 and 1980—at least, on these measures.

Perhaps the major empirical contribution of this study is the series of indices that are developed to measure diversity from a number of perspectives. The indexes mean this analysis can easily be replicated to monitor the level of, and changes in, diversity for years to come. The indexes are simple and are to be applied to the diversity matrix. Each index is described below:

Index A. Diversity is increased as institutions are spread over a large number of types.

Index B. Diversity is increased as large-scale clustering within the most densely populated cell of the matrix decreases.

Index C. Diversity is increased as the concentration of institutions within types decreases.

Index D. Diversity is increased as the proportion of institutions in a sample which belong to a cell in the matrix with no other institutions increases.

Calculation of these indices indicates that diversity decreased between 1960 and 1980. Birnbaum notes: "In general it can be said that during the twenty-year study period, institutions became much more tightly clustered, and much less widely dispersed throughout the diversity matrix." Regardless of the index considered, "the results are the same, and the conclusion inescapable; diversity has in fact decreased."

Lorenz curve analysis was a fifth procedure applied to the data to check the relative and absolute amount of diversity present in the two study years. Plotting the values of the distribution of institutions and institutional types gives us yet another measure of relative diversity in 1960 and 1980. This analysis confirms once more that diversity is decreasing. The Gini index measured "the exact amount of inequality" in the Lorenz curves. A check done on the stability of the Gini index found that it was quite stable when the number of cells in the diversity index were calculated in various ways. This index also correlated highly with index A and index C which were deemed to be good "proxies" for the Gini.

These measures of diversity in the aggregate seemed to prove--one would hope conclusively--that the system of higher education is less diverse in terms of institutional types than it was in years past.

The balance of Birnbaum's analysis shifts once more to a focus on changes in the institutional types across the two study years. This is done by comparing the profile of the ten largest institutional type categories in each of the two years. Five variables (minority/non-minority was eliminated) were used to describe the cells or types in the diversity matrix. Some of the univariate analyses cited earlier can now be checked, at least in part. Some of the interaction between the variables can be estimated indirectly from the tables presented.

The breakdowns demonstrate, for instance, that while two-year degree level and religious control were "associated with a higher than average rate of mortality," it was only a sector of each of these categories that was "negatively selected." For instance, while 28 public two-year institutions failed between 1960 and 1980, 22 of these 28 were small teacher-training or normal schools. Also, while some religious institutions did fail or had to change, only small, single-sex religious schools fared poorly, or were "negatively selected," during the 20-year period.

The analyses presented still left some questions unanswered. First, the tabular presentations did not permit one to estimate the independent effect of some of the variables used in the study. Secondly, while we have seen again that diversity is decreasing, we still find it difficult to estimate the seriousness of this phenomenon. Accepting and assuming that perfect inequality or diversity are unlikely, the Lorenz curve analysis, for instance, would benefit from the identification of a normative or ideal amount of diversity.

Without some kind of baseline or reference point, it is difficult if not impossible to judge whether the observed amount of inequality or diversity is appropriate or excessive or inadequate. The lack of a baseline also makes it difficult to estimate the importance of the magnitude of change observed between 1960 and 1980.

Finally, it would have been interesting to check measures of diversity using one or two different variables in 1980. It is entirely possible that the dimensions of diversity in 1980 have changed more than the level of diversity. This would not have been detected in the Birnbaum analysis.

The following section will consider the method and findings of Birnbaum's study in an exploration of the population ecology model and its potential application to the study of higher education.

The Population Ecology Model and Higher Education

THe introduction of the population ecology model to the study of diversity in higher education is an important contribution of the Birnbaum study. While Birnbaum's use of the model appears to be limiting, the potential applications of an ecological perspective can be substantial. This section will discuss the general direction which the ecology model opens, some limitations of the Birnbaum study, and specific research directions and questions that the model and the study suggest.

The principal value of the population ecology model is that it obligates us to consider the influence or role of environmental factors in organizations such as colleges and universities. The second is that, in using it, we must confront the history of institutions and systems.

The measurement of diversity has now been accomplished quite ably by Birnbaum. We now have a good model for extending similar research to other samples or to the whole population, and to monitor changes in diversity over time. The tools that have been developed describe the composition and character of the higher education system in very specific terms. Our next step should be to move beyond measurement and toward the understanding of how diversity changes or takes form.

We still wonder at this point not only why there are many kinds of colleges and universities, but also, what the environmental and historical forces are which have shaped the current system and those that will likely shape our future system.

The expansion and differentiation of the higher education system was shaped by a number of environmental and historical forces. A perspective on some of these factors will suggest dynamics we should study as we seek to understand the complexity or diversity of higher education.

A number of factors led to the differentiated higher education structure that took shape, in large part, during the two decades studied by Birnbaum. The main environmental and historical factor to consider is that the higher education system has assumed, or has had thrust upon it, an increasingly central role in the total economic structure (its ecosystem). An increasing proportion of the labor force is going through a longer educational sequence. Educational requirements for jobs have been raised as the standard of educational attainment has increased. Colleges have embraced the task of training workers outside the professional, technical, and kindred categories. One might say that the niche of higher education has broadened considerably.

As demand for enrollment increased in the post-war period, established colleges maneuvered for position in the system. Most colleges became increasingly selective. The abundance of environmental resources--both financial and human--permitted institutions to grow. Many sought to improve their status position by admitting only the most "qualified" applicants. The popularization of higher education led to efforts to buttress the most prestigious institutions. A result was that new institutions or structures had to be created to meet the environmental demands that could or would not be met by pre-existing structures. A new species--the two-year college thrived and now accounts for a substantial part of "diversity" in higher education.

In their discussion of "environments of organizations," Aldrich and Pfeffer (1976) and Aldrich alone (1979) discuss the value of both the population ecology, and the resource dependence or political economy models. It seems that both perspectives are necessary to understand the dynamic forces which change and give shape to our complex system of higher education. It seems very timely, moreover, to undertake a study of higher education's environment at this time. A "shake-out" is, or will be taking place; and an understanding of how institutions are affected by and respond to external pressures and internal imperatives would go a long way toward understanding change and complexity in the system. Applying both models would be the most productive approach.

A focus for such a research effort may prove most fruitful at the state level. By making the state the unit of analysis, we would be able to control some aspects of the environment. Specifically, the political and economic pressures could be identified and analyzed more easily in a smaller and controlled research setting. This setting could be the state agency

responsible for planning and coordinating higher education in the state. Those agencies which have a role in coordinating both public and private higher education provide a good laboratory for studying the relations between institutions and sectors, between institutions and the state, and between the state agency and other communities in their "ecosystem."

Focusing on the state and the state agency would also facilitate the study of the system's and institutional histories. The interpretation of organizational change can be considered only with reference to the historically specific social structure in which change occurs. This factor is lost in large-scale studies such as Birnbaum's. For instance, organizations which failed or changed in 1978 were faced with considerably different environmental pressures and options than those which were similarly affected in 1962. Arguably, each time an organization fails or changes, the structure or niche of the survivors is altered.

Confronting historical factors may shed light on such questions as the role of private or liberal arts colleges in today's environment. It may very well be that as the role and activities of higher education become more homogenized, the composition of the system itself will follow. Trow (1961) has described how this occurred in another era to the system of secondary education. It may very well be that diversity in <u>the future</u> that Birnbaum is appropriately concerned with will be measured with different variables. To be sure, using different variables in 1980 may have yielded different results in comparing the level of diversity with 1960. That is, the system in 1980 may be every bit as diverse or more so. The focus on the reduction in the number of types or the number of institutions in the private sector is probably inadequate for estimating how diverse our system is. Our task should now be on

studying diversity within the huge public sector in which most students are enrolled. What environmental forces have and are shaping these systems? How diverse are options for students in this sector and will they be adequate to meet future needs? How has the private sector responded to challenges and changes within the niches which they operate? Studying the history of a system should help us to better understand its present and future.

The questions raised above are very much ecological questions. The models discussed here will prove necessary guides as we seek an understanding of the enviornmental and historical forces which make for diversity.

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